ESI

EnviroSystems, Inc.
P.O. Box 778
Hampton, NH 03843-0778
603-926-3345

August 25, 2017

Mr. Chuck Come
Warner Village Water District
55 West Joppa Road
P.O. Box 252
Warner, New Hampshire 03278

Dear Mr. Come:

Enclosed, please find three (3) copies of our report evaluating the toxicity of an effluent sample collected from the Warner Village, New Hampshire Wastewater Treatment Facility during July 2017. Acute toxicity was evaluated using the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*.

Please do not hesitate to call me or Petra Karbe should you have any questions regarding the report.

Sincerely,

EnviroSystems, Incorporated

Kirk Cram Lisa Bordonaro

Digitally signed by Lisa Bordonaro
DN: cn=Lisa Bordonaro, o=Envirosystems, Inc., ou=NPDES Laboratory Manager, email=lbordonaro@envirosystems.com, c=US
Date: 2017.08.25 07:52:47 -04'00'

Kirk Cram
Toxicology Laboratory Manager

Enclosure
WET Test Report Certification
Report Number 29372-17-07
Three (3) Copies + email

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION

Permittee Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: 10/24/2017

Authorized Signature

Joseph P. Damour

Print or Type Name

The Warner Village Water District

Print or Type the Permittee's Name

NH0100498

Type or Print the NPDES Permit No.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: August 25, 2017

Kirk Cram
Toxicology Laboratory Manager - EnviroSystems, Inc.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
July 2017

Warner Village Wastewater Treatment Facility
Warner, New Hampshire
NPDES Permit Number NH0100498

Prepared For:

Warner Village Water District
55 West Joppa Road
P.O. Box 252
Warner, New Hampshire 03278

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

July 2017
Reference Number: WarnerVillage29372-17-07

STUDY NUMBER 29372

EXECUTIVE SUMMARY

The following summarizes the results of 48 hour acute exposure bioassays performed during July 2017 to support the NPDES biomonitoring requirements of the Warner Village, New Hampshire Wastewater Treatment Facility. Acute assays were completed using the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*.

C. dubia, cultured at ESI, were <24 hours old juveniles released within 8 hours of one another. *P. promelas*, obtained from Aquatic Research Organisms, Inc. of Hampton, NH, were 10 days old at the start of the test. Dilution water was receiving water collected from the Warner River upstream of the discharge. Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications, except where otherwise noted.

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter. Results from the acute exposure assays and their relationship to permit limits are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	A-NOEC	Permit Limit (LC-50)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Ceriodaphnia dubia	48 Hours	>100%	NC	100%	Yes	Yes
Pimephales promelas	48 Hours	>100%	NC	100%	Yes	Yes

COMMENTS:
NC = Not Calculated.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
July 2017

Warner Village Wastewater Treatment Facility
Warner, New Hampshire
NPDES Permit Number NH0100498

1.0 INTRODUCTION

This report presents the results of toxicity tests completed on a composite effluent sample collected from the Warner Village, New Hampshire Wastewater Treatment Facility (Warner Village WWTF). Testing was based on programs and protocols developed by the US EPA (2002), with exceptions as noted by US EPA Region I (2011), and involved conducting 48 hour acute toxicity tests with the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of TNI Standards (2009).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test animals are exposed to each concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate the median lethal concentration, or LC-50, defined as the effluent concentration that kills half of the test animals. Samples with high LC-50 values are less likely to cause significant environmental impacts. The acute no observed effect concentration (A-NOEC) provides information on the effluent concentration having minimal acute effects in the environment and is defined as the highest tested effluent concentration that causes no significant mortality.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms (US EPA 2002), and for the analysis of water samples (APHA 2012). See Section 4.0 for a list of references.

2.2 Test Species

C. dubia were maintained in laboratory water at 25±1°C with a photoperiod of 16:8 hours light:dark. Cultures are fed daily with a yeast/trout chow/Cerophyll or alfalfa leaves (YTC) mixture supplemented with *Pseudokirchneriella subcapitata* (algae) (US EPA 2002). Adults on a brood board were isolated 24 hours prior to test start and allowed to reproduce for 8 hours.

P. promelas were acclimated to approximate test conditions prior to use in the assay. Organisms were transferred to test chambers using an inverted glass pipet, minimizing the amount of water added to test solutions. Cultures were fed newly hatched *Artemia* nauplii until test start. Twenty control fish were weighed during the test to confirm loading rates. The loading rate was below the maximum 0.4 g/L recommended for assays conducted at 25°C. Fish weights and loading calculations are included in the data appendix.

2.3 Effluent, Receiving Water and Laboratory Water

Effluent and receiving water collection information is provided in Table 1. Samples were received at 0-6°C as per 40 CFR §136.3 unless otherwise noted, stored at 4±2°C and warmed to 25±1°C prior to preparing test solutions. Laboratory water was synthetic reconstituted water prepared at ESI according to protocol (US EPA 2002). This water has been used to successfully culture freshwater organisms since 1992.

Total residual chlorine (TRC) was measured by amperometric titration (MDL 0.02 mg/L) in the effluent sample. Samples with ≥0.02 mg/L TRC were dechlorinated using sodium thiosulfate (US EPA 2002).

2.4 Acute Exposure Bioassays

The 48 hour static acute assays were conducted at 25±1°C with a photoperiod of 16:8 hours light:dark. Test concentrations were 100% (undiluted), 50%, 25%, 12.5%, and 6.25% effluent. Daphnids were maintained in 30 mL test chambers with approximately 25 mL of test solution in each of 4 replicates with 5 organisms/replicate. Replicates in the *C. dubia* assay were not randomized; rather, test organisms were derived from a pool of mixed organisms recovered from ESI's culture the morning of testing. All organisms used were recovered from the same type of culture water. Minnows were maintained in 250 mL glass beakers with 200 mL of test solution in each of 2 replicates with 10 organisms/replicate. Replicates were not randomized during testing; rather, organisms were added randomly at test initiation by replicate across test solutions in an alternating fashion (alternating allocation).

Survival was recorded daily in all test replicates of both assays. A fifth replicate in the daphnid assay was included as a surrogate test chamber to obtain daily water qualities without disturbing the test animals, and was treated the same as actual test chambers with the addition of animals and food, but was not used to determine endpoint data. Dissolved oxygen and pH were measured daily, and specific conductivity was measured at the start of the daphnid assay. Dissolved oxygen was measured daily in all replicates and pH was measured daily in one replicate of each minnow test treatment; temperature was measured daily in one replicate of the laboratory water control. Specific conductivity was measured in one replicate of each test concentration at the start of the minnow assay.

2.5 Data Analysis

Data analysis involved, as required, determination of LC-50 values using CETIS™ v1.9.3.0, Comprehensive Environmental Toxicity Information System, software. The program computes LC-50 values using the Spearman-Karber and Probit methods following protocol guidelines. If survival in the highest test concentration was >50%, LC-50 values were obtained by direct observation of the raw data. As needed, the A-NOEC was determined as the highest test concentration that caused no significant mortality.

2.6 Quality Control

As part of the laboratory quality control program, reference toxicant evaluations are completed on a regular basis for each test species. These results provide relative health and response data and allow for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS AND DISCUSSION

Results of the acute toxicity tests completed using *C. dubia* and *P. promelas* are summarized in Table 3. Table 4 contains effluent and diluent characteristics. US EPA Region I Attachment F toxicity test summary sheets are included after the tables. Support data, including copies of laboratory bench sheets, are provided in Appendix A.

Minimum test acceptability criteria require ≥90% survival in the control concentrations. Achievement of these results indicates that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 3 for test acceptability.

4.0 LITERATURE CITED

40 CFR §136.3. *Code of Federal Regulations* (CFR), Protection of the Environment (Title 40), Guidelines Establishing Test Procedures for the Analysis of Pollutants (Part 136), Identification of Test Procedures (sub-part 3), Table II-Required Containers, Preservation Techniques, and Holding Times.

APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. Washington D.C.

The NELAC Institute (TNI). 2009. *Environmental Laboratory Sector, Volume 1: Management and Technical Requirements for Laboratories Performing Environmental Analysis (TNI Standard)*. EL-V1-2009.

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

US EPA Region I. 2011. *US EPA Region 1 Freshwater Acute Toxicity Test Procedure and Protocol*. US EPA Region I Office, Boston, Massachusetts. February 28, 2011.

TABLE 1. Summary of Sample Collection Information.
Warner Village WWTF Effluent Biomonitoring Evaluation. July 2017.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
Effluent	Comp	07/12-13/17	0811	07/13/17	0950	5
Receiving Water	Grab	07/13/17	0741	07/13/17	0950	5

TABLE 2. Summary of Reference Toxicant Data.
Warner Village WWTF Effluent Biomonitoring Evaluation. July 2017.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
C. dubia						
07/27/17	Survival	LC-50	17.2	24.4	2.3 - 46.6	SDS (mg/L)
P. promelas						
07/27/17	Survival	LC-50	34.6	34.5	24.0 - 45.0	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

TABLE 3. Summary of Acute Evaluation Results.
Warner Village WWTF Effluent Biomonitoring Evaluation. July 2017.

Percent Survival

Species	Exposure	Lab	RW	6.25%	12.5%	25%	50%	100%
C. dubia	48 hours	100%	95%	100%	100%	100%	100%	100%
P. promelas	48 hours	95%	95%	100%	100%	100%	100%	100%

LC-50 and A-NOEC Results

Species	Exposure	Spearman-Karber	Probit	Direct Observation	A-NOEC
C. dubia	48 Hours	NC	NC	>100%	NC
P. promelas	48 Hours	NC	NC	>100%	NC

COMMENTS:
RW = Receiving Water; used as the diluent.
NC = Not Calculated.

TABLE 4. Summary of Effluent and Diluent Characteristics. Warner Village WWTF Effluent Biomonitoring Evaluation. July 2017.

PARAMETER	UNIT	EFFLUENT	RECEIVING WATER
Specific Conductivity	µmhos/cm	552	107
pH	SU	7.19	7.37
Total Residual Chlorine	mg/L	<0.02	-
Alkalinity	mg/L	73	9.9
Hardness	mg/L	81	12
Total Solids	mg/L	440	68 [a]
Total Suspended Solids	mg/L	2.7	1.1
Total Dissolved Solids	mg/L	280	19 [a]
Ammonia	mg/L	<0.1	<0.1
Total Organic Carbon	mg/L	11	4.3
Aluminum, Total	mg/L	<0.02	0.067
Cadmium, Total	mg/L	0.0001	<0.0001
Calcium, Total	mg/L	20.5	4.05
Chromium, Total	mg/L	<0.001	<0.001
Copper, Total	mg/L	0.032	0.0011
Lead, Total	mg/L	0.0004	0.0003
Magnesium, Total	mg/L	7.16	0.67
Nickel, Total	mg/L	0.0023	<0.001
Zinc, Total	mg/L	0.11	0.0042

COMMENTS:
Additional water quality and chemistry support data are provided in Appendix A.
[a] Analyte found in laboratory blank at value indicated. Sample result may be affected.

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Warner Village WWTF
NPDES PERMIT NO.: NH0100498
TEST START DATE: 07/13/17
TEST END DATE: 07/15/17

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
X Acute	___ *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	X *Ceriodaphnia dubia*	___ Dechlorinated	X Composite
___ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	___ Chlorinated on Site	___ Other
	___ *Cyprinodon variegatus*	___ Unchlorinated	
___ 24 Hour Screen	___ *Menidia beryllina*	X No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Warner River

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: ___

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 07/12-13/17 ___ ___ ___

EFFLUENT CONCENTRATIONS TESTED (%): 6.25%, 12.5%, 25%, 50%, 100%

Permit Limit Concentration: 100% %

Was the effluent salinity adjusted? NO If yes, to what level? ___ ppt

REFERENCE TOXICANT TEST DATE: 07/27/17 LC-50: 17.2 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Diluent Control Survival: 95%

LIMITS		**RESULTS**	
LC-50:	100 %	LC-50	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC	-%
		C-NOEC	- %
IC- ___	- %	IC- ___	- %

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Warner Village WWTF
NPDES PERMIT NO.: NH0100498
TEST START DATE: 07/13/17
TEST END DATE: 07/15/17

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
X Acute	X *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	___ *Ceriodaphnia dubia*	___ Dechlorinated	X Composite
___ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	___ Chlorinated on Site	___ Other
	___ *Cyprinodon variegatus*	___ Unchlorinated	
___ 24 Hour Screen	___ *Menidia beryllina*	X No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Warner River

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: _____

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 07/12-13/17 _____ _____ _____

EFFLUENT CONCENTRATIONS TESTED (%): 6.25%, 12.5%, 25%, 50%, 100%

Permit Limit Concentration: 100 %

Was the effluent salinity adjusted? NO If yes, to what level? _____ ppt

REFERENCE TOXICANT TEST DATE: 07/27/17 LC-50: 34.6 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Diluent Control Survival: 90%

LIMITS		**RESULTS**	
LC-50:	100 %	LC-50	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC	- %
		C-NOEC	- %
IC- ___	- %	IC- ___	- %

APPENDIX A

RAW DATA

STATISTICAL SUPPORT

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-012 2002.0
Daphnia pulex	EPA-821-R-02-012 2021.0
Pimephales promelas	EPA-821-R-02-012 2000.0
Americamysis bahia	EPA-821-R-02-012 2007.0
Menidia beryllina	EPA-821-R-02-012 2006.0
Cyprinodon variegatus	EPA-821-R-02-012 2004.0
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
Trace Metals	EPA 200.8/SW 6020, EPA 245.7
Hardness	EPA SW846 3rd Ed. 6010
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 22nd Edition - Method 4500-Cl D
Total Organic Carbon	Standard Methods 22nd Edition - Method 5310 C
Specific Conductance	Standard Methods 22nd Edition - Method 2510 B
Nitrogen - Ammonia	Standard Methods 22nd Edition - Method 4500-NH_3G
pH	Standard Methods 22nd Edition - Method 4500-H+ B
Solids, Total (TS)	Standard Methods 22nd Edition - Method 2540 B
Solids, Total Dissolved (TDS)	Standard Methods 22nd Edition - Method 2540 C
Solids, Total Suspended (TSS)	Standard Methods 22nd Edition - Method 2540 D
Dissolved Oxygen	Standard Methods 22nd Edition - Method 4500-O G

Please visit our web site at www.envirosystems.com for a copy of our accreditations and state certifications.

DAPHNID ACUTE DEFINITIVE ASSAY

STUDY: 29372	CLIENT: Warner Village Water District	SAMPLE: Effluent	DILUENT: RW
SPECIES: *C. dubia*	SOURCE: OOCAES 071317		AGE: <24 Hours

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	S/C (µmhos/cm) 0	SAMPLE CHEMISTRIES
MSR	Surr.	10S	5	5	8.5	7.4	7.8	7.44	7.37	7.43	177	See *P. promelas* Sheet for Chemistry Information.
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
RW	Surr.	5	3	3	8.3	7.3	7.8	7.37	7.54	7.51	107	
	A	5	4	4								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
6.25%	Surr.	5	5	5	8.3	7.4	7.9	7.28	7.49	7.53	128	Batch Used *Selenastrum:* A-4745 YCT: 127
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
12.5%	Surr.	5	5	5	8.3	7.6	7.8	7.19	7.46	7.55	157	
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
25%	Surr.	5	5	5	8.4	7.5	7.8	7.12	7.46	7.50	227	
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
50%	Surr.	5	5	5	8.5	7.7	7.7	7.12	7.50	7.52	405	
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
100%	Surr.	5	5	5	9.0	7.6	7.8	7.19	7.66	7.68	552	
	A	5	5	5								
	B	5	5	5								
	C	5	5	5								
	D	5	5	5								
INC TEMP (°C)		25	25	25								
DATE		07/13/17	7/14/17	07/15/17	07/13/17	7/14/17	7115					
TIME		1650	1600	1530	1700	1030	0940					
INITIALS		MS	MW	GRS	KB	AK	MW					

ACUTE BIOASSAY DATA SUMMARY

STUDY: 29372	Brine Shrimp: A- 4090
CLIENT: Warner Village Water District	TEST ORGANISM: *P. promelas*
SAMPLE: Effluent	ORGANISM SUPPLIER/BATCH/AGE: *See Organism Culture Sheet*
DILUENT: Receiving Water (RW)	

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	METALS	TOC	ALK	HAR	AMM	Solids	TRC
Effluent	002	003	004	005	006	007/008	<0.02
Diluent	011	012	013	014	015	016/017	

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DISSOLVED OXYGEN (mg/L) 0	DISSOLVED OXYGEN (mg/L) 24	DISSOLVED OXYGEN (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMPERATURE (°C) 0	TEMPERATURE (°C) 24	TEMPERATURE (°C) 48	S/C (µmhos/cm) 0
MSR	A	10	10	9	8.5	6.5	7.9	7.44	7.36	7.48	22	22	23	177
	B	10	10	10	8.5	6.6	7.9							
RW	A	10	10	10	8.3	7.1	8.1	7.37	7.37	7.50	23	22	23	107
	B	10	9	9	8.3	6.6	8.3							
6.25%	A	10	10	10	8.3	6.7	8.5	7.28	7.24	7.32	23	22	22	128
	B	10	10	10	8.3	6.7	8.6							
12.5%	A	10	10	10	8.3	6.7	8.7	7.19	7.18	7.27	23	22	23	157
	B	10	10	10	8.3	6.6	8.7							
25%	A	10	10	10	8.4	6.7	8.8	7.12	7.27	7.36	23	22	23	227
	B	10	10	10	8.5	6.8	8.7							
50%	A	10	10	10	8.5	6.4	8.9	7.12	7.37	7.49	23	22	23	405
	B	10	10	10	8.7	6.3	9.0							
100%	A	10	10	10	9.0	6.3	9.0	7.19	7.45	7.82	22	22	22	552
	B	10	10	10	9.4	6.4	9.0							
DATE		07/13/17	7/14/17	07/15/17	07/13/17	7/14/17	7/15							
TIME		1720	1605	1540	1700	0915	0945							
INITIALS		KB	MW	GES	KB	AK	MW							

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STUDY: 29372
CLIENT: Warner
PROJECT:
ASSAY: PP48AD
SPECIES: *PP*
TASK: **Wet Weight Data - Balance Output File**
BALANCE: **Ohaus Discovery Balance Model DV215CD**
Serial #: **1124024313**

Date / Intials:	07/13/17 BK BK
Rep	
1	0.00130
2	0.0015
3	0.00231
4	0.00156
5	0.00236
6	0.00268
7	0.00233
8	0.00134
9	0.00286
10	0.00199
11	0.00109
12	0.00131
13	0.00083
14	0.00118
15	0.00276
16	0.00115
17	0.00159
18	0.00118
19	0.00187
20	0.00208
Mean Weight (g):	0.00176
Test Volume (L):	0.2
Loading Rate(g/L):	0.08818

09PPARO071217

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Pimephales promelas

Source: Lab reared x Hatchery reared _____ Field collected _____

Hatch date 7/3/17 Receipt date _____

Lot number 06 3017 FH Strain ARO

Brood origination EPA 014

II. Water Quality

Temperature 24 °C Salinity — ppt D.O. SAT ppm

pH 7.4 su Hardness ≈120 ppm Alkalinity ≈140 ppm

III. Culture Conditions

Freshwater x Saltwater _____ Other _____

Recirculating x Flow through _____ Static renewal _____

DIET: Flake food x Phytoplankton _____ Trout chow _____

Artemia x Rotifers x YCT _____ Other Frp Pest

Prophylactic treatments: _____

Comments: _____

_____

IV. Shipping Information

Client: ESI # of Organisms 17500

Carrier: Pr/c-up Date shipped 7/12/17

Biologist: _____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION OF DILUTIONS

STUDY: 29372	CLIENT: Warner Village Water District	
SPECIES: *C. dubia & P. promelas*		
Diluent: Receiving Water	Day: 0 Start Sample: E_0, D_0	E_0= (E10) D_0= MW 7/20/17
Concentration %	Vol. Eff.(mls)	Final Vol.(mls)
MSR	0	500
RW	0	↓
6.25%	31.25	
12.5%	62.5	
25%	125	
50%	250	
100%	500	
INITIALS:	MS	
TIME:	1645	
DATE:	07/13/17	

(E10) MW 7/20/17 values overlooked at time of mixing.

RECORD OF METERS USED

STUDY: 29372		CLIENT: Warner Village Water District	
C. dubia			
Exposure (Hours)			
	0	24	48
Water Quality Station #	1	1	2
Initials / Date	KB 07/13/17	AK 7/14/17	MW 7/15
P. promelas			
Exposure (Hours)			
	0	24	48
Water Quality Station #	1	1	2
Initials / Date	KB 07/13/17	AK 7/14/17	MW 7/15

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	24	DO meter #	23	
DO probe #	95	DO probe #	94	
pH meter #	1097	pH meter #	470	
pH probe #	145	pH probe #	146	
S/C meter #	YSI30D	S/C meter #	YSI30D	
S/C probe #	↓	S/C probe #	↓	
Salinity meter #	↓	Salinity meter #	↓	

Report No: 29372 SDG:
Project: Warner Village

Sample ID: Effluent Start
Matrix: Water
Sampled: 07/13/17 0811

Parameter		Result	Qualifiers	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	29372-008	440		10	mg/L	07/18/17 1100	07/20/17 1000	KB /SM 2540B
Total suspended solids	29372-007	2.7		1	mg/L	07/18/17 1335	07/19/17 0930	KB /SM 2540D
Total dissolved solids	29372-008	280		5	mg/L	07/18/17 0900	07/25/17 1200	KB /SM 2540C
Alkalinity as CaCO3	29372-004	73		2	mg/L	07/17/17 1000	07/17/17 1303	BS /EPA 310.2
Total organic carbon	29372-003	11		0.8	mg/L	07/19/17	07/19/17	AC /SM 5310 C
Ammonia-N	29372-006	ND		0.1	mg/L as N	07/21/17 1110	07/21/17 1154	AC /SM 4500-NH3 G
Total phosphorus	29372-009	4.8		0.2	mg/L	07/21/17 1545	07/21/17 1600	BS /SM 4500-P E
Hardness as CaCO3	29372-005	81		0.3	mg/L	07/21/17 1400	07/21/17 2059	JLH/ess/SW846 3rd Ed. 6020
Aluminum, total	29372-002	ND		0.02	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Cadmium, total	29372-002	0.0001		0.0001	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Calcium, total	29372-002	20.5		0.05	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Chromium, total	29372-002	ND		0.001	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Copper, total	29372-002	0.032		0.0005	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Lead, total	29372-002	0.0004		0.0002	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Magnesium, total	29372-002	7.16		0.05	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Nickel, total	29372-002	0.0023		0.001	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8
Zinc, total	29372-002	0.11		0.002	mg/L	07/17/17 0845	07/17/17 2012	JLH/EPA 200.8

Sample ID: Receiving Water Start
Matrix: Water
Sampled: 07/13/17 0741

Parameter		Result	Qualifiers	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	29372-017	68	B	10	mg/L	07/18/17 1100	07/20/17 1000	KB /SM 2540B
Total suspended solids	29372-016	1.1		1	mg/L	07/18/17 1335	07/19/17 0930	KB /SM 2540D
Total dissolved solids	29372-017	19	B	5	mg/L	07/18/17 0900	07/25/17 1200	KB /SM 2540C
Alkalinity as CaCO3	29372-013	9.9		2	mg/L	07/17/17 1000	07/17/17 1303	BS /EPA 310.2
Total organic carbon	29372-012	4.3		0.8	mg/L	07/19/17	07/19/17	AC /SM 5310 C
Ammonia-N	29372-015	ND		0.1	mg/L as N	07/21/17 1110	07/21/17 1154	AC /SM 4500-NH3 G
Hardness as CaCO3	29372-014	12		0.3	mg/L	07/21/17 1400	07/21/17 2102	JLH/ess/SW846 3rd Ed. 6020
Aluminum, total	29372-011	0.067		0.02	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Cadmium, total	29372-011	ND		0.0001	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Calcium, total	29372-011	4.05		0.05	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Chromium, total	29372-011	ND		0.001	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Copper, total	29372-011	0.0011		0.0005	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Lead, total	29372-011	0.0003		0.0002	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Magnesium, total	29372-011	0.67		0.05	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Nickel, total	29372-011	ND		0.001	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8
Zinc, total	29372-011	0.0042		0.002	mg/L	07/17/17 0845	07/17/17 2018	JLH/EPA 200.8

Notes:

ND = Not Detected
B = Analyte found in laboratory blank at value indicated. Sample result may be affected.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29372		
SDG No:			
Project:	Warner Village		
Delivered via:	ESI		
Date and Time Received:	07/13/17 0950	Date and TIme Logged into Lab:	07/13/17 1500
Received By:	RS	Logged into Lab by:	GRS GRS
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	5.4	Custody Seals intact?	NA
Number of COC Pages:	2		
COC Serial Number(s):	A1015058		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	A-4689

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Effluent Start	29372-001	W	CDPP48 StartSample	1x3750 P	4 C	
Effluent Start	29372-002	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Effluent Start	29372-003	W	TOC	1x40 G	H2SO4	Yes
Effluent Start	29372-004	W	Alk	125 P	4 C	
Effluent Start	29372-005	W	Metals Hard;	125 P	HNO3	Yes
Effluent Start	29372-006	W	NH3;	125 P	H2SO4	Yes
Effluent Start	29372-007	W	TSS	1000 P	4 C	
Effluent Start	29372-008	W	TS,TDS	500 P	4 C	
Effluent Start	29372-009	W	TP	250mL	H2SO4	Yes
Receiving Water Start	29372-010	W	CDPP48AD StartDiluent	2x3750 P	4 C	
Receiving Water Start	29372-011	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Receiving Water Start	29372-012	W	TOC	1x40 G	H2SO4	Yes
Receiving Water Start	29372-013	W	Alk	125 P	4 C	
Receiving Water Start	29372-014	W	Metals Hard;	125 P	HNO3	Yes
Receiving Water Start	29372-015	W	NH3;	125 P	H2SO4	Yes
Receiving Water Start	29372-016	W	TSS	1000 P	4 C	
Receiving Water Start	29372-017	W	TS,TDS	500 P	4 C	

Notes and qualifications:

See COC

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 29372

CHAIN OF CUSTODY DOCUMENTATION

Client: Warner Village Water District	Contact: Chuck Come	Project Name: Warner	
Report to: Chuck Come	Address: 15 West Joppa Road P.O. Box 252	Project Number: P0107	Task: 0001
Invoice to: Chuck Come	Address: Warner, NH 03278	Project Manager: Chuck Come	
Voice: 603-456-1891	Fax: 0	email:	P.O.No: ' Quote No:40382-A

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
✓ 001	Effluent Start	7-12-17 7-13-17	8:11	CC		1	3750	P	4 C	Water	N	CDPP48 StartSample
✓ 002	Effluent Start					1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
✓ 003	Effluent Start					1	40	G	H2SO4	Water	N	TOC
✓ 004	Effluent Start					1	125	P	4 C	Water	N	Alk
✓ 005	Effluent Start					1	125	P	HNO3	Water	N	Metals Hard;
✓ 006	Effluent Start					1	125	P	H2SO4	Water	N	NH3;
✓ 007	Effluent Start					1	1000	P	4 C	Water	N	TSS
✓ 008	Effluent Start					1	500	P	4 C	Water	N	TS,TDS
✓ 009	Effluent Start					1	250m	mL	H2SO4	Water	N	TP

Relinquished By: Chuck Come Date: 7-13-17 Time: 950

Received By: RSaft Date: 7/13/17 Time: 950

Relinquished By: Date: Time:

Received at Lab By: Date: Time:

Comments:

ERR 5.4°C

COC Number: A1015058

Sample Delivery Group No: July 2010

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Data Appendix Page 10

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 29372

CHAIN OF CUSTODY DOCUMENTATION

Client: Warner Village Water District	Contact: Chuck Come	Project Name: Warner	
Report to: Chuck Come	Address: 15 West Joppa Road P.O. Box 252	Project Number: P0107	Task: 0001
Invoice to: Chuck Come	Address: Warner, NH 03278	Project Manager: Chuck Come	
Voice: 603-456-1891	Fax: 0	email:	P.O.No: ' Quote No:40382-A

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
✓ 010	Receiving Water Start	7-13-17	7:41 AM	CC		2	3750	P	4 C	Water	N	CDPP48AD StartDiluent
✓ 011	Receiving Water Start					1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
✓ 012	Receiving Water Start					1	40	G	H2SO4	Water	N	TOC
✓ 013	Receiving Water Start					1	125	P	4 C	Water	N	Alk
✓ 014	Receiving Water Start					1	125	P	HNO3	Water	N	Metals Hard;
✓ 015	Receiving Water Start					1	125	P	H2SO4	Water	N	NH3;
✓ 016	Receiving Water Start					1	1000	P	4 C	Water	N	TSS
✓ 017	Receiving Water Start					1	500	P	4 C	Water	N	TS,TDS

Relinquished By: [signature] Date: 7-13-17 Time: 950 Received By: [signature] Date: 7/13/17 Time: 950

Relinquished By: Date: Time: Received at Lab By: Date: Time:

Comments:

ERR

COC Number: A1015058

Sample Delivery Group No: July 2010 Page of

Assay Review Checklist

DATE IN: 7/13/17
DATE DUE: 10/15/17

STUDY#: 29372
CLIENT: Warner Village Water District
PROJECT:
ASSAY: CDPP4BAD

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	07/13/17	KB	
Day 1	7/14/17	MW	
Day 2	07/15/17	GRS	
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	7/20/17	MW	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	N/A	N/A	
Weights Reported	7/20/17	MW	
Assay Acceptability Review	↓	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	N/A	N.A	
Statistical Analysis Reviewed	↓	↓	
Data Acceptability Review	7/20/17	LB	
Supporting Chemistry Report	8/11/17	LB	
Draft Report	8/11/17	LB	
QA Audit/Review Complete			
Final Report Reviewed	8/11/17	AK	
Final Report Printed - PDF	8/25/17	LB	
Executive Summary / Chems Sent			
Report E-mailed / Faxed	8/25/17	LB	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive			

P:\GENERAL PROJECTS\FORMS\LABFORMS\$ Assay Review Checklist 2013.wpd